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STUDIES IN TUBERCULOUS SENSITIVITY IN THE PIG

II.—Fluctuations in Hypersensitivity

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The exact nature of the hypersensitive reaction exhibited by the tuberculous animal exposed to a suitable preparation of tuberculin still is not established beyond doubt. A sensitising antibody, for example, has not yet been satisfactorily demonstrated though there are aspects of the phenomenon of tuberculous sensitivity which suggest an antibody-antigen type of mechanism. There is evidence that the antigen resides in the protein fraction of the tubercle bacillus but the actual antibody has proved much more elusive: for instance, the passive transfer of hypersensitivity cannot readily be accomplished. Rich (1944) after reviewing the available evidence observes, " It seems in the highest degree probable that hypersensitivity of the tuberculous type is dependent upon antibody but that in this form of hypersensitivity in contrast to other types practically all the antibody is closely associated with the cells and too little excess antibody accumulates in the circulation to permit passive transfer." It is possible, as Rich points out, that the acquired capacity to react specifically to a foreign protein may be effected through some as yet undefined mechanism that may be entirely independent of antibody, but in view of the fact that the development of specific antibody is demonstrably responsible for all other forms of hypersensitive reactions to foreign protein it would appear unlikely that this single type depends upon some entirely different fundamental mechanism ; particularly since as far as is known it differs from the other types chiefly in the relative speed with which the reaction develops and in the distribution of the cells that are sensitised.

The nature and status of the hypersensitive reaction in tuberculosis are of considerable practical importance. The diagnosis of early pre-clinical tuberculous infections by ordinary testing techniques is dependent on the presence of a state of hypersensitivity. The factors that make for alterations in the degree of intensity of such reactions during the course of a tuberculous infection are therefore manifestly of importance. Studies on the hypersensitive state during the course of a tuberculous infection in the pig are essential to a better appreciation of the whole problem of *ante-mortem* diagnosis in this species. Of value, too, is a comparison of the hypersensitivity exhibited and the extent of the pathological processes in the body.

During the course of some earlier experiments in the pig (Luke, 1951) there was evidence that pointed to loss of hypersensitivity and it appeared that under certain conditions this loss of hypersensitivity readily could occur. It seems logical to conclude that the maintenance of the state of hypersensitivity should be associated, in part at least, with the establishment and proliferation of an active focus of tuberculosis in the host. The active multiplication of bacilli in such a focus leads to the liberation of small quantities of tuberculo-protein which, in turn, sensitise the host tissues. It is generally accepted, also, that when a focus becomes arrested, though hypersensitivity may persist for a period, eventually it will wane and may even disappear altogether. From the evidence on hypersensitivity reviewed by Rich (1944) it would appear that it is not necessary for all the organisms in a lesion to die out before hypersensitivity is lost. The maintenance of hypersensitivity depends on the freeing of specific antigen from the bacilli and though the bacilli in a quiescent lesion may cease to proliferate, they may remain alive for some time. In such circumstances the amount of antigen liberated will be small. It is probable, too, that the sensitised cells will retain their ability to react for some time after the production of antigen has ceased. Moen (1936), for example, has shown that cells from a tuberculous body will retain their hypersensitivity *in vitro* in tissue culture for three successive transplants over a period of one month.

Fluctuations in the response to the tuberculin test have been observed in different species when such are tested at intervals. For example, intercurrent infections appear to have some depressing effect on the ability of the animal to respond to tuberculin. Bloomfield and Mateer (1919) observed changes in the response to the tuberculin test during the course of influenza in tuberculous humans. Parturition in the tuberculous cow is associated with loss of sensitivity (Kerr *et al.*, 1949).

Howe (1938), as the result of the study of the daily variations in the tuberculin reaction in humans, found a definite correlation between these variations and the state of the peripheral blood vessels as measured by the diastolic blood pressure levels. Periods of peripheral vaso-constriction are accompanied by a decreased reaction to tuberculin and, conversely, periods of peripheral vaso-dilation are accompanied by an increase in the reaction to tuberculin. In all the subjects studied by Howe the trend of the reaction at the same time is roughly parallel and the " peaks " and " troughs " of the curves for different subjects coincide fairly well. This, according to Howe, is in accord with the observations of Petersen (1937), who has shown that vaso-constriction and vaso-dilation are largely influenced by the meteorological environment. The mechanism involved in these variations seems to be one of periodic changes in the vascular and tissue permeability which in turn would influence the extent of local exudation during the tuberculin reactions.

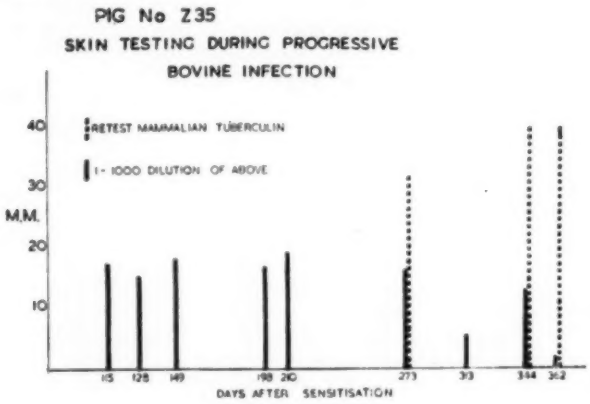
Apart from such extrinsic and non-specific factors true specific depressions in hypersensitivity probably occur. The ability of tuberculo-protein to bring about experimental desensitisation is well known. When the breakdown of a tuberculous focus takes place the products of such are discharged into the blood stream. These will lead to the exposure of the body cells to a possible excess of tuberculo-protein and so a temporary desensitisation will occur. Rich

(1944) has observed temporary depressions in sensitivity following the injection of tubercle bacilli or emulsions of caseous tissue into the blood stream of tuberculous animals.

FLUCTUATIONS IN HYPERSENSITIVITY

(*a*) During Progressive Tuberculosis

In carrying out sensitising experiments using live bovine bacilli a small percentage of pigs show progressive tuberculosis culminating in generalisation and death. During the progress of the disease a series of tests was carried out on such a pig. In the main the disease pursues a slow chronic course with death after a period of many months of wasting disease. The results of a series of tests in a case of chronic progressive tuberculosis in the pig are summarised in Graph No. 1.



Graph No. 1

This pig, No. Z.35, had been sensitised with 1 ml. of an emulsion of a tuberculous bronchial gland. Tested with 0·1 ml. of a 1:1,000 dilution of Weybridge retest mammalian tuberculin (1·5 mg. tuberculo-protein per ml.) this animal showed a fairly level skin response up to about nine months after sensitisation. Thereafter the response to this dilute tuberculin waned and three months later there was little demonstrable response invoked by this strength of tuberculin. Yet tested at this stage with undiluted Weybridge mammalian retest tuberculin this animal gave a good skin reaction. This pig was tested six times with 1:1,000 retest tuberculin in the 273 days after sensitisation and the increases in skin measurements varied from 15·5 to 19·5 mm. At the 273 day test a separate site was injected with 0·1 ml. of Weybridge retest mammalian and a skin increase of 23·5 mm. was recorded. This increase corresponds fairly well to the response to the 1:1,000 dilution at this test, *viz.*, 16·5 mm. A test at 313 days with the dilute tuberculin showed only a 5·5 mm. increase in skin thickness. At 344 days the response to the dilute tuberculin was 12·5 mm. and to the undiluted tuberculin 40 mm. At the final test at 362 days after sensitisation and ten days before death the skin increase was 40 mm. to the retest strength and 1 mm. to the 1:1,000 dilution. It will be seen that the tests with the dilute tuberculin from the 273rd day onwards indicated a downward trend in the skin response, which response showed more fluctuation than heretofore.

Differential white cell counts were made over the period of the reactions during each test. In all cases there was a drop in the number of lymphocytes and a rise in the number of polymorphonuclears producing a positive blood response. This pig died 372 days after sensitisation. *Post-mortem* examination showed advanced generalised tuberculosis involving all the internal organs and all the carcase lymph glands. Acid-fasts were very numerous in smears from the lesions. Cultures and biological tests using guinea-pigs were both positive.

(*b*) During Regressive Tuberculosis. Bovine Type

Two other pigs were sensitised at the same time and in the same way as Z.35 above. Both these pigs continued to thrive satisfactorily and both showed a high degree of sensitivity to 1:1,000 dilution of tuberculin up to slaughter at 244 days after sensitisation. In the case of Z.33 the last test prior to slaughter showed a skin increase of 43 mm. and in Z.37 this test showed a skin increase of 17 mm.

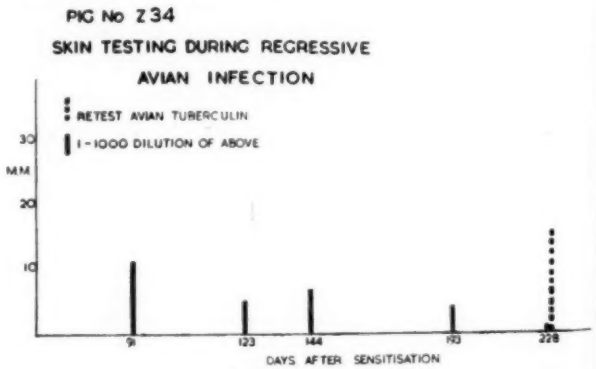
Post-mortem examination of Z.33 showed evidence of tuberculosis in the liver and spleen, and in the mesenteric lymph glands as well as in all the carcase lymph glands. Biological test, using guinea-pigs, was positive. In Z.37 there was evidence of tuberculosis in all the carcase lymph glands, in the mesenteric and bronchial lymph glands and in the liver and spleen. Biological test in this case also was positive.

A second group of three pigs, Z.45, Z.46 and Z.47, was sensitised using 1 c.c. of a bovine type culture which was injected intraperitoneally. At 190 days later these pigs were tested with retest tuberculin. In Z.45 there was a skin reaction of 5·5 mm. but only a very slight blood reaction. In Z.46 a rise in skin thickness of 1·5 mm. was recorded but again no blood reaction, while in Z.47 a 1 mm. rise was found and no blood reaction.

Post-mortem examination failed to show any macroscopic evidence of tuberculosis in Z.45. In Z.46 two small tuberculosis lesions were found in the mesenteric lymph glands. Cultural and biological tests using guinea-pigs were negative. *Post-mortem* examination of Z.47 was also negative.

(*c*) During Regressive Tuberculosis. Avian Type

So far we have not seen any cases of progressive tuberculosis in experimental pigs sensitised with live avian organisms. In our experiment the pigs were sensitised with approximately 10 mg. of live organisms injected intraperitoneally. The testing history of one of these pigs is summarised in Graph No. 2.



Graph No. 2

Using a 1:1,000 dilution of Weybridge retest avian tuberculin (0·4 mg. of tuberculo-protein per ml.) a skin test at 91 days after sensitisation showed a skin reaction of 11 mm. and a positive blood reaction. At 123 days a similar dilution of tuberculin invoked only a 5 mm. skin response and a depressed positive type of blood reaction.

At a test at 144 days 6·5 mm. rise in skin thickness occurred but no blood reaction, while at 193 days the dilute tuberculin produced a 4 mm. rise in the thickness of the skin but again no blood reaction took place. A final test was made at 228 days using both the dilute tuberculin and the retest strength. To the former a skin test of 1 mm. was recorded, while to the latter the rise in the skin measurement was 15·5 mm. Only a depressed positive type of blood reaction occurred.

This pig was slaughtered 247 days post-sensitisation and lesions of tuberculosis were found in the gastric and mesenteric lymph nodes. Cultural examination and biological tests using chickens were negative.

Two other pigs in this group, Z.32 and Z.36, showed a similar testing history. In the final test at 228 days Z.32 showed a skin response of 28·5 mm. to retest tuberculin but no response to the 1:1,000 dilution. A positive blood reaction took place at this test. In Z.38 a rise of 1 mm. occurred to the dilute tuberculin ; a rise of 12·5 mm. to the retest strength and a positive blood reaction were recorded at the 228 day test.

A group of seven pigs (Nos. Z.51 to Z.55, Z.57 and Z.59) were sensitised to avian organisms in the same way as before.

These pigs were subjected to various testing procedures and in general it may be said that in the preliminary testing with 1:1,000 dilution of tuberculin a high degree of hypersensitivity was not observed in any of the animals. Skin responses to this dilution tended to wane fairly rapidly. These pigs were finally tested at 112 days after sensitisation. The results are summarised in Table I. Cultural and biological tests were carried out on all the lesions from this group but these were uniformly negative.

TABLE I

LIVE AVIAN INFECTION
Summary of Results 112 Days after Sensitisa ion

Pig No.	Skin test: Retest tuberculin	Skin test: 1:1,000 dilution	Blood test	P.M. result
	mm.	mm.		
Z.51	+ 10	+ 2	Depressed positive	Negative
Z.52	+ 3·5	+ 1·5	Negative	+ Gastric gland, slight peritonitis
Z.53	+ 7	+ 4	Positive	+ Gastric gland
Z.54	+ 10	+ 1	Depressed positive	+ spleen + mesenteric gland, peritonitis
Z.55	+ 14	3·5	Depressed positive	Negative
Z.57	+ 8·5	+ 1	Depressed positive	Negative
Z.59	+ 6	+ 1	Depressed positive	+ spleen + gastric gland

DISCUSSION

In progressive tuberculosis the body is constantly absorbing by-products of the disease process, *e.g.*, tuberculo-protein, sufficient to produce systemic effects, *viz.*, anorexia, dullness and pyrexia, all of which were exhibited by No. Z.35. The slight fluctuation in the skin response exhibited in the earlier tests of this animal could therefore be interpreted as resulting from changes in hypersensitivity due to partial desensitisation as the result of the liberation of amounts of tuberculo-protein in excess of that required to maintain hypersensitivity at its optimum intensity. Other extraneous factors such as those considered by Howe (1938) also may have influenced these testing results. Partial desensitisation resulting from the active multiplication of bacilli is likely to be more apparent towards the final crisis of the disease. In the case of Z.35 this would appear to explain the behaviour of the skin test using the 1:1,000 dilution of tuberculin. The testing results using the retest strength of tuberculin are in sharp contrast to the response to dilute tuberculin at the 344 and 362 day test. To the retest strength a strong degree of skin sensitivity was elicited. Testing results in humans, however, indicate that the weaker the sensitivity the greater the amount of tuberculo-protein required to induce a reaction and the mechanism underlying this phenomenon may in part at least be the explanation of the testing behaviour in the pig under discussion.

Pilcher (1930) has pointed out that the well-nourished tuberculous human reacts to a comparatively small dose of tuberculin but as the disease progresses and loss of weight increases there is a gradual loss of sensitivity so that in some cases more than 1,000 times the original effective quantity of tuberculin may provoke no reaction at all in the period before death. Accompanying this loss of sensitivity to tuberculin Pilcher found a progressive decrease in the sensitivity of the skin to local non-specific irritants. He suggests that decrease in the circulation of the skin and subcutaneous tissues is an important factor in this decrease in sensitivity to tuberculin shown by tuberculous subjects who have lost much weight.

In the case of regressive tuberculosis there is a considerable variation noted in the response of different pigs when exposed to the tubercle bacillus. In cases Nos. Z.33 and Z.37 widespread extension of the disease occurred without any apparent interference with the thriftiness of these animals. In that of No. Z.33 the high degree of skin sensitivity prior to slaughter is worthy of comment. In the former two pigs there was no apparent correlation between the extent of the pathological process and the degree of sensitivity exhibited.

The behaviour of the three pigs Z.45, Z.46 and Z.47 on fairly heavy exposure to bovine type culture is of interest. In none of these was a high degree of sensitivity established. Z.45 is of interest in that there was a demonstrable skin hypersensitivity at 190 days post-sensitisation but yet no macroscopic lesions were detected in the carcase at *post-mortem* examination. In this examination, all glands were examined with multiple incisions and particular attention was paid to those lymphatic glands draining the peritoneal cavity—the site of the original infection. The duration of sensitivity of 190 days in the absence of macroscopical lesions and therefore in the absence of sites of active multiplication of the bacilli is worthy of comment. In Z.46 little skin sensitivity was seen at 190 days yet macroscopic lesions were found in the mesenteric lymph nodes, indicating that the establishment of a tuberculosis focus in the body is not necessarily accompanied by the persistence of a high degree of skin hypersensitivity. In Z.47 there was only 1 mm. rise in skin thickness at 190 days and no evidence at *post-mortem* examination of any macroscopic lesions of tuberculosis.

In this second group of pigs the fate of the bovine bacillus when introduced into the peritoneum of the pig was very variable and in only one did macroscopic foci become established even though no very high skin sensitivity was produced. As this group had been sensitised by a bovine type culture grown on Dorset egg medium as compared with the use of an emulsion of a tuberculous bovine bronchial gland in the first group, the possibility of loss of pathogenicity on the part of the culture must be considered as being responsible for the apparent low invasive powers in the group Z.45, Z.46 and Z.47. The culture used had

been grown on artificial medium for about six months and the actual material used had been harvested from a recent sub-culture. Tested in guinea-pigs this culture was fully virulent for this species at 28 days. On the whole it would seem that this group had considerable resistance to the effects of the bovine bacillus as used in the experiments. Apart from these specific cases we have since used the same culture for sensitising further groups of pigs and these have shown a satisfactory level of skin hypersensitivity. The three pigs Z.45, Z.46 and Z.47 were litter mates and there may have been a genetic factor in this apparent resistance to the culture employed.

Though we have not seen any cases of progressive tuberculosis in pigs experimentally sensitised with live avian organisms, cases of generalised tuberculosis due to the avian type of organism have been recorded. Feldman (1938) has recorded a number of cases of generalised tuberculosis in pigs due to avian type infection. In the cases under review at present the avian culture used has shown much lower invasive powers.

Pigs show considerable variation in their response to live avian organisms introduced into the peritoneal cavity. Using the dilute tuberculin there is a fairly rapid drop in skin sensitivity though up to 247 days post-sensitisation fairly satisfactory skin tests can be elicited by the retest strength. In the second group of pigs Z.43 had completely lost sensitivity at 194 days. The results in the third group emphasise the lack of correlation between the intensity of hypersensitivity and the extent of the *post-mortem* lesions. In three of this group no macroscopic evidence of tuberculosis was found 112 days after sensitisation intraperitoneally yet one of them, Z.55, showed the highest skin test of this whole group. The lack of macroscopic evidence of tuberculous lesions at *post-mortem* examination does not preclude the possibility of microscopic tubercles being present in some of these cases. However, in view of the fact that in these cases sensitivity is waning, it is unlikely that, even though such microscopic foci may exist, they contain actively multiplying bacilli.

The ability of the pig under the experimental conditions to overcome active tuberculous infection as judged by the negative results of cultural and biological tests is worthy of comment. Nevertheless, it is noteworthy that the group of three pigs sensitised direct from the tuberculous bronchial lymph gland all yielded positive biological tests in guinea-pigs. Two out of three pigs sensitised with bovine culture showed negative *post-mortem* examinations and the third showed lesions in the mesenteric lymph gland only, but culturally and biologically these were negative. Yet this culture was virulent for the guinea-pig. Microscopical examination showed only scanty acid-fasts in the tuberculous bovine gland used to sensitise the first group so that those pigs inoculated with the bovine culture must have been exposed to many times the number of bacilli compared with the bovine gland group. The foreign protein inevitably present in the bovine gland inoculum may have exerted some adjuvant action.

The results so far recorded indicate that the pig has considerable power to overcome tuberculous infections and wide variations are seen in the response to the same infecting dose of organisms. In the experiments recorded cultural and biological tests four to eight months after infection with avian organisms failed to show the presence of any viable organisms. Even exposure to comparatively large doses of bovine organisms is not necessarily followed by persisting infection. However, a measure of skin sensitivity does seem to persist beyond the period of active proliferation and viability of the invading organism in the host's tissues.

The alterations in the relationship of the white cells of the blood during tuberculin reaction are characteristic. During the progress of the test in an active sensitisation there is a fall in the number of lymphocytes and a rise in the number of polymorphonuclears, these changes producing the characteristic " cross over " when the values for these cells are depicted graphically. In a waning sensitivity there is variation of the typical positive blood reaction produced via the depressed positive type. In this there is a drop in the number of lymphocytes and a rise in the polymorphonuclears but these changes are not sufficient to induce the " cross over." In some cases the skin may retain a small degree of sensitisation and react to tuberculin when no observable changes occur in the blood.

Summary

(1) Factors involved in fluctuations in tuberculous hypersensitivity are discussed briefly.

(2) Experimentally induced tuberculous infections in pigs are described which indicate a wide variation in the response of this species to the same dose of tuberculosis bacilli.

(3) Tuberculin test results during progressive bovine type tuberculosis and during regressive bovine and avian type tuberculosis in the pig are recorded.

(4) Loss of skin sensitivity readily occurs during regressive infections but there is evidence that complete loss of sensitivity does not occur until some time after the death of the invading organisms.

Acknowledgments.—The author's best thanks are due to Dr. H. G. Lamont and Dr. W. R. Kerr for their helpful advice, to Mr. T. Cahill for technical assistance during the experiments, and to Mr. T. Todd for preparing the graphs.

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WORLD HEREFORD BREEDERS' COUNCIL

The Hereford Herd Book Society's Council has adopted, without reserve, resolutions (reported in a recent issue) passed at the recent world conference of Hereford cattle breeders.

The resolutions included the setting-up of a world organisation of Hereford Cattle Breed Associations to be known as the World Hereford Breeders' Council which, formed with the object of promoting the interest of the breed everywhere, will meet once every three years in one of the member countries. The Herd Book Society Council gave their unanimous approval to a recommendation by the conference that the secretariat and headquarters of the world organisation should be at their offices at Hereford.

Approval was also given of the conference resolution standardising the register of Hereford cattle in the principal herd books of the world, particularly England, America, Canada and Argentina.

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George Stubbs' Paintings at the Walker Art Gallery.—The reopening of the Walker Art Gallery, Liverpool, is particularly noteworthy as featuring a magnificent collection of pictures by George Stubbs, and many of our readers may be glad to take advantage of this opportunity of seeing so many of the works of this wonderful anatomist animal painter. This particular collection is open until August 25th, the closing hour being 6 p.m. (Wednesdays and Saturdays 8 p.m.; Sundays 2 to 5 p.m.).

THE GAMBIA POULTRY FARM

(Contributed)

The affairs of the Gambia Poultry Farm have received considerable publicity in recent months but comparatively little has been published on its veterinary aspects.

The farm was instituted by the Colonial Development Corporation, a body created under the Overseas Resources Development Act in 1947 with the object of improving the standard of living of the colonial people by increasing their productivity and wealth and also to redress the dollar deficit which was a feature of the economic situation of many of the colonial territories. The first Chairman was Lord Trefgarne and the Deputy Chairman the late Sir Frank Stockdale. The Corporation organised itself into eleven divisions one of which was the Animal Products Division under the control of Dr. Fowler, an agriculturist.

The first project undertaken by the Corporation was the poultry farm in the Gambia and the work appears to have commenced in March, 1948.

It is difficult to get any detailed information from official reports; indeed, an unusual degree of secrecy has been a feature of the scheme. The annual reports of the Corporation for 1948 and 1949 give little or no information on such important points as the origin of the scheme; what expert advice, if any, was obtained before the scheme was accepted; the qualifications and experience of the staff of the Animal Products Division; the qualifications and experience of the European staff employed in the farm in Gambia.

In seeking information on these matters, the daily Press, the poultry Press and *Hansard* have been consulted but the most detailed information has been obtained from an article in French, by French veterinarians, Doctors Mornet and Orue ((1950) *Revue d'Elevage et de Médecine Vétérinaire des Pays Tropicaux*. **4.** 11–19). Dr. Mornet is a very senior officer of the French Colonial West African Veterinary Service and is well known to many of us. This article is factual, illustrated with photographs and has been a useful source of information.

The farm was in charge of an American citizen, a Mr. Phillips, born in Jacksonville (Florida), who had been the accountant and manager of a large mixed dairy, pig and poultry farm in the Bahamas.

The programme was to produce annually 1,000,000 lb. of dressed poultry and 20,000,000 eggs for export to Great Britain. There was to be a stock of 100,000 laying hens with an average annual egg yield of 200 eggs per bird. The financial prospects of the scheme apparently were based on the following calculations (taken from the above-mentioned French publication):—

Receipts per annum	£
20,000,000 eggs at 2½d. each ... ... =	208,333
1,000,000 lb. of table poultry at 2s. per lb. =	100,000
	£308,333

Expenditure per annum	£
Salaries and wages	40,000
Petrol, oil, etc.	20,000
Fish meal and vitamin concentrates	30,000
Depreciation on tractors, vehicles, etc. ...	10,000
Depreciation of plant	35,000
Incidentals	23,333
	158,333
Balance profit ...	150,000
	£308 333

It will be seen that the only foodstuffs which were to be purchased were fish meal and vitamin concentrates; all other foodstuffs were to be produced on the farm and this was vital to the financial success of the scheme. Imported foodstuffs would have cost about £30 a ton but it was expected that they could be produced locally at £10. Vitamin concentrates were essential as no greenstuff was grown on the farm.

To implement this ambitious scheme a total sum of £820,000 was provided.

The scheme was thus on a very large scale and it would have been expected that veterinary service would have been utilised extensively in the early planning stages and that once the plan had been accepted provision would have been made for suitable whole-time veterinary service, equipped with a diagnostic laboratory on the farm from the very beginning. Facilities for diagnosis and control of disease were vital on a poultry farm of this size in Africa where disease problems unknown in England were likely to occur.

So far as can be ascertained from the official reports of the Corporation no attempt was made to obtain the necessary veterinary advice during the planning stage of the scheme. A Press handout from the Corporation dated March 16th, 1950, states that Dr. R. F. Gordon, of the Animal Health Trust, was appointed Veterinary Consultant in 1949 and that "he was *recently* (our italics) invited to visit the farm." Therefore from March, 1948, until 1949 the Corporation had apparently no source of veterinary advice. It was not until 1950 that Dr. Gordon was asked to visit the farm; the visit was a short one and was not repeated.

We are now told that the scheme is a failure. The reasons for the failure include the following: Inability to grow foodstuffs locally; a high degree of infertility in hatching eggs; nutritional disorders; disease (30,000 deaths from fowl typhoid); lack of shade leading to over-exposure of the birds to intense heat; and flooding during the rains.

It is certain that much of this could have been foreseen and guarded against if scientific advice had been sought and used in the actual designing and establishing of the farm.

The primary mistake was to clear completely a block of 10,000 acres; any veterinarian acquainted with poultry in the tropics knows that they must be protected from excessive heat as the heat regulating mechanism of the fowl is ill-adapted to deal with direct and prolonged exposure to the sun. The wild jungle fowl is of tropical origin but in its native habitat is seen out in the open only in the morning and evening, and then never very far away from shade to which it retires during the heat of the day. Except during rainy weather jungle fowl are never seen out in the open between the hours of 9 a.m. and 4 p.m.

The reactions of the domestic fowl to hot atmospheres have been studied experimentally in Queensland by Yates, N. T. M., Lee, D. H. K., and Hines, H. I. S. ((1941.) *Proc. Roy. Soc. Queensland*. **53.** 105–128), and the importance of shade in tropical climates is illustrated by their findings. For example, 80° F. is the highest dry bulb temperature that hens uniformly can tolerate without showing disturbances of temperature and respiration. A dry bulb temperature of 100° F. cannot be safely withstood for seven hours unless the humidity is below 75 per cent. A dry bulb temperature of 105° F. can be withstood for only a few hours. In hot weather water must be readily accessible in containers which permit the head to be dipped into the water, as it is relatively more important that the fowls should be able to wet their heads than that they should drink.

Information regarding the temperature at the poultry farm is not available, but at Bathhurst temperatures vary between 60° and 100° F. and in the interior of Gambia from 60° to

110° F. and humidity in many months exceeds 80 per cent. At such temperatures it is obvious that shade would be very necessary, an opinion which is confirmed by any available photographs of the poultry on the farm, in which the birds, except those which have just been driven out to be photographed, are seeking some relief from the scorching sun by collecting inside their sleeping quarters.

Infertility and low hatchability of eggs and nutritional disorders in chicks are well known consequences of a lack of greenstuff in the diet and should have been foreseen.

Avoidance of overstocking, the dividing up of stock into separate units and isolation from outside sources of infection are elementary principles of livestock hygiene particularly in the tropics. One would expect provision to have been made for their observance. In actual fact the laying hens were kept at the rate of 1,250 per acre in a large enclosure. Each such enclosure contained 25 slatted-floor sheds. These sheds were not separated from each other in any way. A rate of stocking of 1,250 per acre in open runs would be highly dangerous in England ; it was lunacy in the tropics.

A labour force of some 1,000 Africans was employed. They lived outside the farm and doubtless many of them kept native fowls in their villages. No steps were taken to control their movements to and from the farm and they were able to gain access at many points as there was no boundary fence. The danger of introduction of infection is obvious.

The failure to grow crops suggests that adequate agricultural advice may not have been utilised. Whether that be so or not, it is interesting to note that Dr. Mornet points out in his article that a certain well-known very troublesome weed, *Icacina senegalensis*, was widespread on the farm. This plant has a tuberous root weighing anything from 10 to 100 lb. and according to Mornet it is a veritable pest very difficult to eliminate even by repeated deep cultivation. Mr. Phillips proposed to feed pigs on this root but Mornet says that on account of its bitter taste pigs will not eat it unless it has been soaked in running water for two or three days, a rather extravagant process.

Much more might be added, but sufficient has been said to suggest that better use of scientific, including veterinary, knowledge might have been made at different stages of the scheme.

The Corporation appears to have made the all too common mistake, where livestock production is concerned, of failing to seek veterinary advice in the initial stages on such highly important matters as hygiene, nutrition, husbandry and disease prevention. This attitude is analogous to seeking the advice of an agricultural officer only when some disease attacks the crops or of telling the medical officer of health that he is to have nothing to do with housing, sanitation, nutrition or immunisation unless and until a major epidemic breaks out in the community.

Veterinary science has at its disposal a mass of knowledge on problems of nutrition, physiology, housing, disease prevention and acclimatisation which makes the veterinarian an essential member of any team endeavouring to develop livestock production in the colonial territories.

The Animal Products Division of the Colonial Development Corporation has other livestock schemes in mind such as the establishment of an abattoir for sheep in the Falkland Islands, beef production in Bechuanaland, Nyasaland, British Somaliland and Fiji, and dairying in Nyasaland, the West Indies and the British Honduras, all of which will involve the grading-up of indigenous breeds, the prevention and control of disease, the establishment and running of abattoirs, supervision of stock routes, etc.

Adequate veterinary assistance will be essential if these

(Concluded at foot of next column)

schemes are not to repeat the failure of the Gambia Poultry Farm.

The Gambia Poultry Scheme has cost the British taxpayer £910,000. In addition it has lowered the prestige of British colonial endeavour.

THE NIGERIAN LIVESTOCK MISSION REPORT

(CONTRIBUTED)

With the laudable object of trying to develop the meat resources of Nigeria, the Colonial Secretary, on the advice of his Advisory Council for Animal Health, decided in 1948 to appoint a small Mission which would visit the territory at two different seasons of the year and submit a report on the following terms of reference :—

> To investigate the livestock industry in Nigeria and the Cameroons under British Mandate, with particular reference to meat production, engaging where necessary in discussion with the authorities of the neighbouring French territory on problems of mutual interest, and to make recommendations.

The Mission originally consisted of :—

(1) Sir Frank Ware, well known as an ex-Animal Husbandry Commissioner, Government of India.

(2) Mr. Gilbert Colville, a well-known rancher in Kenya Colony.

(3) Mr. T. J. Shaw, an agricultural graduate. Mr. Shaw is known to be connected with the firm of Zwanenberg, Organon, Ltd., and presumably is interested in the exploitation of glandular products. For a short time prior to the last war, he was Secretary and Manager of the Pigs Marketing Board (Northern Ireland).

The report,* as recently published by the Colonial Office, states that Sir Frank Ware, owing to serious illness contracted during the only visit paid by the Mission to the territory, was compelled to offer his resignation on return to this country, and the report is, therefore, signed only by the two gentlemen last named above.

The report contains no reference to any opinions which may have been recorded by Sir Frank Ware as a result of his tour of the country, nor is it clear whether the report as now published has received the approval of the Advisory Council for Animal Health at the Colonial Office. This Council includes veterinary representatives and it is difficult to believe thay they would have agreed to the publication of a report which shows so much anti-veterinary bias.

The authors soon run into the difficulty, so often experienced in the past by administrators in colonial territories, of having to decide on the most suitable arrangement for the direction of livestock policy, and they deal with this in a summary fashion by declaring that the Agricultural Department must be held responsible for livestock policy and that the Veterinary Department should confine itself to dealing with disease.

For many years past, the Nigerian Veterinary Department has consistently sponsored the development of the livestock industry. If space permitted, much could be written about what it has done in connection with meat and milk production, the hides and skins trade, fattening and transport arrangements, pig " hatcheries " and, above all, the great success it has attained in gaining the confidence of the Fulani, who constitute almost the whole of the stock-owning population of Nigeria.

* (1950.) Report of the Nigerian Livestock Mission. London : H.M.S.O. Colonial No. 266. 5s.

The conclusion cannot be escaped that, had the authors of the report adhered to the terms of reference of the Mission, they would not have been in a position to recommend such an upheaval of the territory's agricultural system as they have included in their report.

By this means, and by recommending the substitution on a large scale of semi-trained veterinary "Mallams" in place of properly qualified veterinary officers, whose work in some cases is held up to ridicule, the authors are able to convey the impression that as soon as the Agricultural Department is numerically in a position to assume responsibility for all livestock work, in addition to their admittedly heavy duties in connection with crops and soils, it will be a waste of public funds to retain the Veterinary Department in its present form any longer.

It is imperatively important, therefore, in the interests of the Nigerian Veterinary Department, and, indeed, of the Colonial Veterinary Service and the tax-paying public as a whole, that the position which the profession can and should take in the sphere of livestock development, should be authoritatively stated. It should surely be the aim of every administration on economic grounds alone, if for no other reason, to maintain as efficient a Veterinary Department as possible, and to make as much use of it as possible.

The authors of the report consider it is preposterous to assume that disagreement between the Veterinary and the Agricultural Departments arises from a contest for control of livestock policy. We agree that it is preposterous to suggest it is anything else but a scientific question. Presumably, the authors would concede that the subject of Preventive Medicine must remain the prerogative of the veterinarian, but it is obvious that they have never asked themselves the question, where should preventive medicine begin? In order to obtain maximum efficiency, the young and developing animal should be in the care of one set of animal specialists, not necessarily all veterinarians, from the time when reproduction begins until the production or processing stage is reached. Later, when any animal product is ready for distribution to the consumer, the veterinarian must again come into the picture, and in undeveloped countries it may be necessary before this for him to introduce pilot schemes for the production of different animal products. In order to give point to these expanded duties of a Veterinary Department working in tropical countries, the name of the department has in some territories been changed, with advantage, either to Animal Health, Animal Husbandry or simply Livestock Department.

To the modern veterinarian, the suggestion that he must confine his attention only to disease conditions, particularly in undeveloped tropical countries, is as exasperating as it would be to a medical graduate to be told that his assistance was not required in matters relating to public health.

It is, of course, important that the department concerned with livestock development should be very closely co-ordinated with other departments concerned in the rural economy of a territory. The outstanding problem in the world to-day is the provision of more food, both animal and vegetable, and very closely bound up with this, particularly in overseas countries, is the question of soil erosion. The three departments most concerned with these subjects are respectively the Veterinary Department (or whatever it is called), the Agricultural Department and the Forest Department, all of whose work must be closely integrated if the best results are to be obtained. For this purpose it is suggested that the ideal plan for any overseas territory to adopt is to set up a policy committee consisting of the heads of these three departments, if necessary under lay chairmanship, which will lay down the main lines of policy to be followed by each department; and within the framework of this over-riding committee, the head of each of the departments named should be held responsible for the territory's livestock, cropping and forestry programmes respectively.

The importance of this last statement cannot be stressed too often. In those territories where a decision has not yet been made as to which department is responsible for livestock policy, the greatest confusion is found in the minds of the public generally, amongst corporate bodies, trading firms and private individuals interested in the subject and even within the administration itself when advice in regard to a livestock project is required. On the other hand, in those territories where a separate organisation for livestock development has been set up and charged with the responsibility of formulating and carrying through the livestock policy of the territory, the confusion and departmental bickering which react so adversely on the livestock themselves and on the plans designed for their improvement are absent.

Any plans for a fuller development of the Nigerian livestock industry must be based on a clear appreciation of climatic conditions and made to conform with the comparatively short wet season with its rapid growth of pasturage and fodder crops. The nomadic habits of a vast proportion of the pastoral tribes derive in great measure, if not exclusively, from a need to find new water supplies during the dry season; pasturage is often a secondary consideration.

Artificial water supplies, combined with fodder cultivation and the conservation of pasturage before it becomes too old and innutritious, form the basis of livestock improvement in Nigeria.

The authors' final conclusions may be summarised as follows:—

> "We have no doubt that a livestock industry of considerable size can in the course of time be developed in Nigeria, and that the industry can produce at such prices as will enable it to sustain an important export trade. Her breeds of cattle, her vast undeveloped tracts of potentially good cattle land, the possibilities she has of growing relatively cheap corn, her port facilities and her nearness to Great Britain, are all points in her favour."

These are the same conclusions which were drawn by the Veterinary Department in Nigeria a good many years ago and have been expressed frequently since.

Broadly, the authors' recommendations are: Settlement of the nomad Fulani—in order to integrate more closely the livestock population with agricultural policy—centralised slaughtering of livestock and the processing of animal products.

The nomadic habits of the Fulani are to cease and cattle reserves are to be created in favourable areas where land tenure, security of fodder and water supplies, and the provision of favourable markets will act as incentives to the Fulani to settle and undertake improved methods of animal husbandry.

There is much of a practical nature to commend settlement, for only by this means can the better feeding and management of the herds be obtained. Rotational grazing, pasture improvement, cultivation of fodder crops for ensilage, conservation of grass, etc., can all be practised under a system of settled farming. The high incidence of trypanosomiasis among northern Nigerian herds is in great measure contracted at the dry season grazing grounds, which are usually situated along the banks of permanent rivers and streams. A settled life in the tsetse-free areas would eliminate much of the economic loss from this cause.

The benefits that would arise from a settled Fulani population and a greatly increased number of peasant farmers engaged in the breeding and feeding of livestock are fully recognised, but many complications await the implementation of the long-term plan of the Mission. To talk of fencing in the vast areas of land that would be required to enclose the huge herds and flocks of Nigeria is to put fantasy before realism. The cost of erection and upkeep of such a fence would be enormous, to say nothing of the dangers of close confinement in its bearing on the spread of disease and tick and parasitic infestations, but improved pasturage, rotational grazing and the growth and conservation of fodder crops, all essential factors of an improved livestock industry, can all equally well be attained by the methods of herding customarily practised by the Fulani. An example of what can be done in this matter is to be found in the Veterinary Department's successful experiment on the Jos Plateau.

It is said that the Fulani are oblivious of the lures of material gain. This opinion derives no doubt from their reluctance to sell cattle, but now that rinderpest and other diseases which formerly decimated the herds in frequently occurring epizootics are under control and no longer feared, there is no need to retain large numbers of surplus male stock, and the Fulani are now becoming much less averse to sell. Although the Fulani may have been reluctant to sell stock, they have never failed to take advantage of existing markets for milk and butter. The one incentive required to get these people to settle is the provision of good markets for milk. The desire to benefit from these cash markets is a powerful incentive to the Fulani to adopt approved methods of breeding, feeding and management in order to increase the production of milk. With herds improved for milk production it would not be long before numerically increased and improved male stock also came on the market.

Breeding farms, four in number, are, according to the authors, to be established by the Agricultural Department, instead of the five recommended by the Veterinary Department in its ten-year plan for the livestock industry. At each of these farms the economic qualities and possibilities of each of the main local breeds of cattle are to be determined and developed. Peasant farmers scattered in their thousands throughout both Southern and Northern Nigeria are to be educated in the advantages and methods of mixed farming, with an emphasis on animal products rather than on cash crops. It is pointed out that the advantages of animal production are not confined to increased quantities of meat and milk, but are shared with the importance of maintaining soil fertility by the provision of manures of which Nigerian soils are so sadly lacking. One is tempted to wonder, however, how far the policy of mixed farming and cattle cultivation will have progressed before the cry for mechanical cultivation is heard.

Centralised slaughtering of livestock is to become in time the universal practice and for this purpose factory abattoirs are to be established in all the chief producing areas, but for the present, only one abattoir is to be established, at Kano.

These abattoirs through their central organisation and area controls are to become the pivotal point of the whole scheme of livestock development and, indeed, of the whole agricultural set-up of the northern territories, in which they will operate. In order to understand the significance of the Mission's proposals in relation to the future livestock policy of the country, it is necessary to know something of the ownership or organisation under which these abattoirs are to operate.

There is to be a Central Board of eight members, of whom, initially, three will be official members appointed by the Governor. It is suggested by the Mission that these three appointments might be the Secretary of Finance, the Director of Agriculture and a member of wide commercial and financial experience. Of the other members, one would be a representative of the Agricultural Co-operative Movement, and four would be Nigerians representing producer interests.

Operating under the Central Board are to be established Area Boards, one for each factory abattoir, and the composition of these Area Boards is to be on similar lines to that of the Central Board, except that the members are to be of less senior standing. Instead of the Director of Agriculture, his place on the Area Board is to be taken by a Senior Agricultural Officer, and the other members are to be: a representative of the Finance Department of the Native Administrations, the Manager of the factory abattoir, a representative of the Agricultural Co-operative Movement and five Nigerians representing producers.

The composition of these boards is extremely important, for it is in this that the chief interest of the Veterinary Department lies. Be it noted that there is to be no veterinary representative on either the Central Board or the Area Boards, and with no other expert representative, it is inevitable that the Director of Agriculture would dominate the whole policy of the boards, and through the Board, so the development of the livestock industry. There may be something to be said for an organisation which combines all the different interests of the livestock industry and co-ordinates their activities, but nothing can be said for an organisation which does not include a veterinary representative and which, indeed, openly flouts the need for one.

It is needless to dwell on the inherent weakness of the proposed organisation and the pitfalls which beset a policy of livestock development in a country like Nigeria, with its epizootic and enzootic diseases as a constant menace to the health and productivity of herds and flocks, which fails to provide for close veterinary supervision and control.

A large modern building for an abattoir, costing roughly £250,000, is to be erected, and in the experimental stages this will handle only the beasts that are at present slaughtered in Kano for local consumption, roughly 35,000 cattle and 50,000 small stock a year, and another 35,000 cattle of inferior quality which are at present sent by road to the southern markets.

Another 35,000 cattle which are at present sent by rail from Kano—and these are the stronger and better quality animals—will continue to be sent by rail, although ultimately they, too, will be slaughtered at the Kano abattoir.

Meat to cover local demands in Kano will be issued from the abattoir to butchers in the fresh state, but all other meat will be processed and marketed as canned stewed steak.

It is a long story, but it is detailed here to point to the inherent weakness in a scheme which, even as an initial experiment, is to cost £250,000, to say nothing of the costly European management (a manager, deputy manager and an accountant). All the scheme can hope to achieve is to improve methods of slaughtering and take 35,000 of the poorer cattle off the road.

The urgent need in Nigeria is for more meat and better quality meat. There is also a need to amend the present methods of slaughter at Kano and other places not excluding Lagos, for besides the infliction of much unnecessary cruelty by the present methods of killing, there is a dangerous disregard for hygiene in the dressing and handling of the carcases. But having admitted all this, it does seem a needlessly heavy expenditure to build a factory abattoir costing £250,000 only to produce canned meat, the public demand for which is highly problematical.

SUMMARY

The report reveals little knowledge of the requirements for livestock development in the tropics.

It overlooks the important point that the veterinarian's chief duty in tropical areas is not the cure, nor, used in a narrow sense, even the prevention of disease, but the general well-being and development and utilisation of all classes of stock.

The Nigerian Veterinary Department has made great efforts and attained considerable success in persuading the Fulani, who own most of the economic cattle in Nigeria, to adopt better methods of animal husbandry, without greatly altering their pastoral mode of life.

Now it is proposed that these efforts should cease and that the Agricultural Department should attempt to introduce a system of mixed farming throughout the territory.

This ignores two fundamental facts:—

(a) In the Northern Region, where 90 per cent. of the economic cattle of the territory are to be found, they are owned by Fulani, who are nomads by nature and have a very pronounced pastoral tradition.

(b) In the Coastal Regions cattle cannot at present be maintained at an economic level, owing to the prevalence of trypanosomiasis.

In the former area there is surely a better case for developing cattle ranching, which the Fulani would enter into with great zest, while in the latter case it would be more sensible for the Agricultural Department to devote its energies to the introduction of mechanisation, which in any event will become the recognised method of cultivation in the coastal areas in a few years' time.

The Nigerian Veterinary Department has often advocated the erection of a central abattoir at Kano, and this suggestion made in the report is sound, but for the control of this and other items of livestock policy, it is proposed to set up one Central and a number of Area Boards, on none of which is there to be any veterinary representative.

And this in a country where many of the most virulent cattle plagues still exist and may become epizootic at any moment!

ANIMAL DISEASES RESEARCH ASSOCIATION

The annual meeting of the Association was held at Moredun Institute on July 18th, 1951. There was a large attendance.

Dr. J. Russell Greig, C.B.E., the Director of the Institute, in submitting his report, said that the year had been a busy and a satisfactory one. They were prosecuting research on *ad hoc* disease problems including scrapie, enzootic abortion, yellowses, tick-borne fever and grass sickness, apart from their programme of fundamental work.

Dr. Greig hoped to publish, at a fairly early date, an account of the progress of research on grass sickness. He paid tribute to the tolerance and understanding of the agricultural community and the Press in their acceptance of the negative efforts to find a cure or preventive.

Dr. Greig then introduced Dr. A. D. McEwen, who gave a résumé of the work done on enzootic abortion in ewes.

Mr. H. Crow, O.B.E., Under-Secretary of the Department of Agriculture for Scotland, said that Moredun Institute was not just a building but a living thing. He felt that the influence of its atmosphere radiated from the vital human qualities which characterised the personality of its Director, Dr. Russell Greig.

Mr. George G. Mercer, C.B.E., Southfield, Dalkeith, who presided at the meeting, was re-elected President, Mr. Alex. McCallum, O.B.E., was re-elected Vice-President and the Duke of Buccleuch was re-appointed Honorary President. Major A. F. Wallace, of Candacraig, was appointed Honorary Vice-President.

CLINICAL COMMUNICATIONS

THE USE OF ANAVENOL K FOR CASTRATING YOUNG HORSES

J. BOLTON, M.R.C.V.S.,

Beckermet, Cumberland

It was decided to test the anaesthetic for castrating unbroken colts in general practice.

Administration.—The apparatus used was a Willows-type injector as described by Parry but without a tap. At the outset the writer was under the misapprehension that it would be difficult or even impossible to administer the suspension too rapidly by this means, in consequence of which Colt No. 1 received its quota of the drug much too quickly and this undoubtedly accounts for the sequelae. Thereafter more care was taken to regulate the speed of injection, but even so it was soon apparent that this was a matter of some difficulty with the apparatus available. While it was easy to step up the speed of injection it was almost impossible to retard the flow appreciably before a considerable volume of the mixture had disappeared into the horse's circulatory system at an undesirably high velocity. After a prolonged pause in pumping, one had little indication at a given moment whether the suspension was flowing slowly or had ceased to flow entirely. Eventually a simple "release valve" was improvised which went a long way to meeting these difficulties. It was hoped that it would be possible to administer the Anavenol entirely single-handed, but the necessity for observing the patient closely, particularly towards the end of the administration, greatly prejudiced accurate timing. It was much better to appoint a man to keep time.

The subjects, with the exception of No. 3, were yearling Clydesdales: the majority had never been handled at all until the day of operation.

Procedure.—The animal was haltered, led into a field and a twitch applied. A small area of skin at the site of injection was clipped and disinfected; 2 c.c. of local anaesthetic was injected subcutaneously and the injector needle introduced into the jugular vein in a forward direction. The apparatus was then attached and the injection commenced.

It is worth while recording that no difficulty was experienced once the animal had been secured and the twitch applied. The animals took no notice either of the preliminary injection of local anaesthetic or of the subsequent introduction of the intravenous needle. The writer believes that much avoidable trouble is occasioned by the routine use of blinds in this class of animal. If a colt can see what is going on around him he is much less apprehensive and, provided the operator moves quietly and deliberately, little difficulty need be anticipated in carrying out these simple preliminaries. It may be necessary in the case of particularly violent colts to pull the head rope round a post before a twitch can be applied. Where this is necessary the injection can safely be carried out in this position. One can release the head rope quietly once the injection is well under way. Sidelines were applied as soon as the animal went down.

Colt	Dose	Time	Comments
1	150 c.c.	70 secs. (approx.)	Animal fell to the ground as if poleaxed. Anaesthesia good, but cremaster pull on both testes quite strong. Floundering, slow recovery 45 minutes with many unsuccessful attempts to rise; much trembling, sweating and nasal discharge—"Barbiturate hangover"?
2	100 c.c.	75 secs. (approx.)	This was a particularly violent animal. It went down very quietly. Anaesthesia poor. strong cremaster pull; recovery 15 minutes.
3	250 c.c.	210 secs.	This animal did not go down. The bottle was empty except for 50 c.c., which the injector would not lift. Cast and operation carried out with local infiltration. Casting was easy and there was little struggling. It should be noted that this was a two year old.
4	125 c.c.	65 secs. (approx.)	Half way through it was realised that the suspension was flowing too quickly; needle removed on first sign of sway. Animal fell suddenly a few seconds later. Anaesthesia light; strong cremaster pull. Recovery 20 minutes. This case underlined the need for better control of the pressure within the container. "Release valve" used in later administrations.
5	200 c.c.	150 secs.	This colt was more slender than either 6 or 7—all three belonged to the same owner. It was much more highly strung and this may be regarded as support for the contention that the more nervous animals require higher dosage. The writer is not very convinced. Went down very quietly; anaesthesia very light; recovery rapid.
6	90 c.c.	70 secs.	Went down quietly; anaesthesia light; recovery rapid.
7	90 c.c.	80 secs.	Fell rather suddenly; anaesthesia quite good; recovery slow: 30 minutes.
8	100 c.c.	95 secs.	Went down quietly; anaesthesia almost negligible; recovery very rapid. This was a much heavier animal than any of the preceding yearlings.

In no case was any excitement encountered during induction, but only in No. 1 and No. 7 could the anaesthesia be regarded as adequate, and in both of these recovery was slow.

Conclusion

The writer feels that the anaesthesia resulting from a single injection of Anavenol K is too unpredictable for the method to commend itself as a routine. In some subjects it is little more than a means of control, but for that purpose it is excellent. It would seem necessary to administer a second dose of this or some other drug when the animal is down or otherwise to supplement the narcosis, *e.g.*, by local infiltration or chloroform inhalation if the operation is to be carried out really painlessly.

The Apparatus

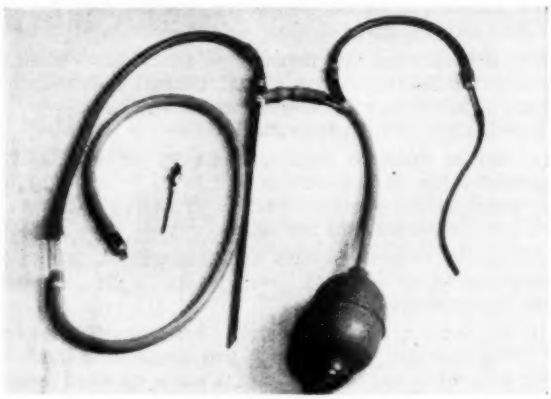

Fig. 1.

Fig. 2.

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NEWCASTLE DISEASE IN WEST AFRICA *

D. FORREST HAMILTON, M.R.C.V.S.,

Veterinary Officer, Gambia

Newcastle disease in British West Africa has not been previously described, so far as is known, and the following observations on a recent outbreak in the Gambia may be of interest.

The first outbreak to be confirmed occurred some months earlier, and about 200 miles distant from the one now described. There have been a number of epizootics in native poultry, with heavy mortality, in the last two years, and although they could not be investigated there is evidence to suggest that the disease may have been Newcastle disease. It is not at all unlikely that Newcastle disease is more widespread in West Africa than generally is suspected.

In this present outbreak, which occurred in a town where there are both native and cross Rhode Island Red birds, the owners reported that many fowls had died, the usual sequence being that the birds lost their appetite, drank much water, became unsteady on their legs, and died.

On inspecting some of the sick birds it was observed that a number had a frothy yellowish-green diarrhoea, which had an offensive odour but was not blood stained; also noticeable were abnormal vocal sounds, exudation of mucus from the beak, respiratory distress and nervous affection of the legs and wings. More advanced cases lay on their sides, quite unable to move, with legs bunched up and toes clutched; respiration was laboured and thin threads of mucus came from the mouth, while on opening the beak cheesy mucoid clots were visible on the larynx.

Several sick birds were taken to the Laboratory for observation and investigation. Blood and faeces were examined periodically but no positive findings were obtained.

A constant lesion found on *post-mortem* examination was a greyish mucous exudate in the pharyngeal-laryngeal region. The trachea appeared normal. In most of the carcases examined lesions were found in the mucosa of the proventriculus, varying from petechiation to well-defined raw ulceration. In some, the contents of the small intestine were very fluid and coloured with bile and occasionally the mucous membrane was inflamed and ulcerated. In such the large intestine was filled with bright yellow watery faeces. In a few cases the kidneys were pale and spongy. Sometimes small haemorrhages were seen on the fat surrounding the auricles at the base of the heart.

Blood from an infected bird was inoculated, intramuscularly, into susceptible hens and rabbits. Also pharyngeal exudate from sick poultry was instilled into the pharynx of susceptible birds.

All these artificially infected birds reacted and died in from two to four days. The symptoms noted were standing about in a crouched position, inco-ordination of the legs and wings, unsteady gait when moving and slight greenish diarrhoea. At *post-mortem* examination only the presence of mucus in the pharyngeal-laryngeal region and slight congestion of the heart were observed.

Periodic examination of blood from the artificially infected birds and rabbits was negative. Investigation by cultural methods also gave negative results.

The diagnosis of Newcastle disease was confirmed later by a report on infected carcases which had been sent to the United Kingdom for examination.

The mortality rate in this present outbreak was in the region of 80 to 95 per cent., although in a few flocks of 20 to 30 birds it reached 100 per cent. It is of interest to note that, as the outbreak progressed, some hens were observed to show only slight diarrhoea and excessive thirst for two or three days, then apparently recover; about four days afterwards, however, the characteristic abnormal vocal sounds would be heard, and the hens die in 12 to 18 hours, showing no other symptoms.

Post-mortem examination of such cases showed well-marked lesions, *viz.*, presence of sticky mucus in the pharynx and larynx, oedoema of the glottis, and well-marked haemorrhage and ulceration of the proventriculus.

Such cases at no time showed nervous lesions.

Blood smears were taken at all stages of observation, and again proved negative.

Summary

1. An outbreak of Newcastle disease is reported and described.

2. Hens showing pronounced nervous inco-ordination died within two to four days of first symptoms.

3. An apparent recovery after initial diarrhoea, followed by abnormal vocal sounds and sudden death, was a noticeable feature of a number of birds.

4. Constant *post-mortem* findings were confined to the pharynx, larynx, and proventriculus, it being worthy of note that such findings were much more marked in those hens which, later in the outbreak, had made a seeming recovery and did not evince any symptoms of nervous disorder.

5. Native and R.I.R. crosses were equally susceptible.

6. Diagnosis was made from clinical symptoms, *post-mortem* lesions and the elimination of non-virus diseases by microscopic, cultural and animal inoculation methods.

Acknowledgment.—I should like to thank Mr. A. Fulton, Director of Veterinary Services, Sierra Leone/Gambia, for permission to publish this article; also for his interest and assistance in the preparation of this paper.

* This contribution originally was received from the author in August, 1950, but circumstances precluded its publication at that time.—*Editor.*

The " release valve " referred to above is made by cutting off the end of a teat infusion needle. The one usually supplied with a B.W. flutter valve answers very well, but any similarly " hefty " needle will do. The cutting should be done with the stilette *in situ* to avoid compressing the lumen and the edges should be smoothed with a small file. A short length of cycle valve tubing is attached to the cut end and the mounted end is connected by tubing to one arm of a T or Y piece interposed between the pump and the injector inlet. All connections must be air-tight. The valve tubing is allowed to hang down the front of the bottle against which it is compressed by the first and second fingers of the left hand. The back of the bottle, which is graduated, is next to the operator, who thus can observe the level of the contents. By releasing the pressure on the tubing the flow is arrested almost immediately, however hard one has been pumping. Momentary release will retard the rate of flow proportionately. The principle may be applied to any make of pump injector and can be used as a ready means of switching from pressure administration to gravity flow, *e.g.*, when injecting calcium or chloral solutions.

FOWL PEST AGAIN IN MIDLANDS

An outbreak of fowl pest was confirmed among poultry on a farm at Titley, near Kington, Herefordshire, on July 30th. Dr. A. J. Wilsdon, Ministry of Agriculture divisional veterinary officer, urged poultry farmers to confine purchases of day-old chicks to their own county.

ABSTRACTS

Q Fever *

1. The author, after giving symptoms and means of laboratory diagnosis of Q fever, reviews the literature concerning its epidemiology from its recognition in Queensland, Australia, before the war to its present recognition in the Americas and most countries of Europe. In Australia the disease was associated with occupational exposure to cattle in such a way as to suggest dust infection with the causal agent *R. burneti*. It appeared that the bandicoot (a small bush animal) might be the reservoir of infection, the disease being spread in this species by its tick *H. humerosa*. In Morocco a similar role has been attributed to the gerbille and its tick. How it might spread to cattle was not clear since *H. humerosa* is not known to feed on cattle nor have cattle ticks been found infected with *R. burneti*. In 1944 there were several extensive outbreaks in troops stationed in the Mediterranean and Balkan areas, the epidemiological findings suggesting that it was a dust-borne infection of a susceptible population introduced into an endemic area. In 1946 the disease was recognised in U.S.A. (Texas and Chicago) and since 1947 in France, Germany, Palestine, Switzerland, Spain, Turkey, South America and Britain. It has been shown in California that the milk of affected cattle is often infective and that drinking it accounts for a proportion of human cases. Others have been traced to contact with affected sheep, goats and cattle. The causal agent has been found in large numbers in the placenta of cattle and in the placenta, colostrum and naso-pharangeal secretions of sheep. In Britain, the first evidence of infection was found in 1949 and, since then, a small outbreak has occurred in London and sporadic cases in the southern and western counties. *R. burneti* has also been isolated from the milk of farms in several parts of the country.

2. In domestic animals the infection is probably symptomless, although it has been claimed to cause broncho-pneumonia in sheep and goats and abortion in sheep. In Britain, cattle sera are being screened to discover the extent of infection.

3. The author describes an interesting outbreak of Q fever among the students of a college and shows that, but for the sagacity of the college authorities, it would not have been recognised as an outbreak since the affected students received treatment from different medical practitioners over a wide area. Two students showed symptoms suggestive of enteric or salmonella infection. The majority of cases were milder and yielded to symptomatic treatment. No signs of atypical pneumonia were observed.

A. W. G.

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Psittacosis †

Human primary atypical pneumonia due to the psittacosis virus was ascribed to contact with parrots. Later it was recognised that parrakeets, budgerigars and canaries may be affected. A closely related virus has now been isolated from pigeons in which adult birds may be carriers, young birds showing symptoms with a high mortality. The virus has been isolated from chickens and antibodies detected in the sera of ducks and turkeys. A related virus has been isolated from persons affected with mild respiratory disease (meningo-pneumonitis virus) and also some strains of psittacosis seem capable of direct spread from person to person. The antigenic relationship of the psittacosis viruses and lymphogranuloma venereum virus has been established by using antigens prepared by growing them in the yolk sac of fertile eggs. About 10 per cent. of cases of primary atypical pneumonia in Britain are due to these viruses and about one-third of cases show a history of close contact with birds. The complement fixation test is not reliable for diagnosis in chickens and pigeons due to a blocking antibody.

A. W. G.

*Q Fever (Marmion, B. P.).; 2. Q Fever (Slavin, G.); 3. An Outbreak of Q Fever in Canterbury (Harvey, M. S.). (1951.) *J. Roy. San. Inst.* 71. 97-102 (12 refs.); 102-103, and 103-106.

†Psittacosis : Some Recent Developments (Macrae, A. D.). (1951.) *J. Roy. San. Inst.* 71. 121-123 (22 refs.).

(*Concluded at foot of next column*)

Royal Army Veterinary Corps War Memorial

UNVEILING CEREMONY

At half-mast the Corps' flag hung listlessly. Beside it, still hidden by the Union Jack, stood the 1949-45 War Memorial of the Royal Army Veterinary Corps; and beneath an overcast sky the public gathered in readiness for the service. The band of the First Royal Dragoons struck up, and the procession, small but impressive, approached the War Memorial. The guard of honour, to an older generation apparently incredibly young, sprang to attention, and were inspected by the Colonel Commandant of the R.A.V.C., Brigadier G. A. Kelly, C.B.

The Mace Bearer precedes the R.C.V.S. Registrar, Mr. W. G. R. Oates, the President, Professor J. G. Wright, and the President, N.V.M.A., Mr. S. F. J. Hodgman, in the procession.

The service opened with the hymn "Put thou thy trust in God," and then the Colonel Commandant said:—

"It is an honour for me to take this parade. Your turn-out is in the best traditions of the Corps about which there is something to be proud.

"The Corps to-day is worthy of those who gave their lives and whom we are remembering this morning. I could not wish for more.

"We are a going concern and the Corps' traditions are being maintained as in the past. The Corps almost ceased to exist before the last war, but with the first-class nucleus remaining it was revived when badly needed. It served many vital purposes, including Remount duties, and was acknowledged to be of great value in all areas.

"I believe that the Corps will not be found wanting in another war. We can tackle any problem in respect to all classes of animals and in any part of the world.

"There is a very good spirit in the Old Comrades' Association of the R.A.V.C. It is good to see men from all parts of the country gathering together. There are not the usual bickerings of the times we live in, perhaps it is because of our joyful association with animals.

"It is a fine thing to see the old comrades get together again. I am glad to note that the young men are not leaving it to the old-timers.

"You men belong to a good show. Be loyal to it. Once you join the Corps you should never forget it. We get men from many other arms, but once they join our Service they remain faithful to us and to each other. That is the right spirit to foster in these troublesome times.

"May we always remember the men who gave their lives for their Corps, King and Country. God rest their souls."

Then, moving to the Memorial, he pulled the cord, the Union Jack fluttered to the ground, and Brigadier Kelly said, "To the glory of God and in proud and grateful memory of all ranks of the Royal Army Veterinary Corps who gave their lives for King and Country and a righteous cause in the years 1939-1945, I unveil this Memorial."

THE MEMORIAL

The Chaplain-General to the Forces, the Rev. Canon F. Ll. Hughes, then dedicated the War Memorial in clear and beautiful words, saying:—

"In the Name of the Father, and of the Son, and of the Holy Ghost, I dedicate this Memorial to be an enduring remembrance of those of this Corps who gave themselves that we might possess our homes in freedom and in peace.

"'They shall grow not old, as we that are left grow old,
Age shall not weary them, nor the years condemn.
At the going down of the sun and in the morning
We will remember them.'"

And the congregation replied:—

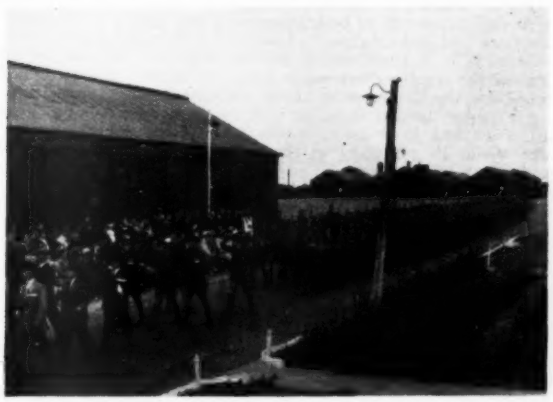
"We will remember them."

This was followed by the Last Post and Reveille, ringing out clear and true in the morning air. Prayers, another hymn, the Collect of the R.A.V.C., the National Anthem and the blessing completed the ceremony.

L.–R., Front Row—Brigadier A. G. Heveningham, O.B.E., Brigadier G. A. Kelly, C.B., Colonel A. G. Ralston.
Second Row—Professor J. G. Wright, Mr. S. F. J. Hodgman, Councillor Eagles, Mr. W. G. R. Oates, the Chaplain-General (Rev. Canon F. Ll. Hughes).

Wreaths had been placed around the base of the Memorial from Warrant Officers and Sergeants of the Royal Army Veterinary Corps, members of the R.A.V.C. Old Comrades' Association, the Colonel Commandant, Commander of all ranks R.A.V.C. stationed at Melton Mowbray, the Chairman and members of the Melton Mowbray Urban District Council.

The Colonel Commandant and his aides now moved to another part of the ground where Brigadier Kelly took the salute at the March Past, and then the proceedings of the morning, simple, dignified and, withall, very moving, came to an end.



THE MARCH PAST

Brigadier Kelly was supported throughout by the Director of Army Veterinary Services, Brigadier A. G. Heveningham, O.B.E., and Colonel A. G. Ralston.

Among the distinguished guests present were: Professor J. G. Wright, President, and Mr. W. G. R. Oates, Registrar, representing the Royal College of Veterinary Surgeons, and Mr. S. F. J. Hodgman, representing the National Veterinary Medical Association.

In the afternoon the Gymkhana, organised by the R.A.V.C., took place nearby. The large and enthusiastic crowd saw not only the usual contests of a gymkhana, such as style and appearance, children's ponies, jumping, and musical chairs, but also a display of war dogs trained by the R.A.V.C. These war dogs, which were Alsatians, proved to be in complete harmony with their masters, and gave an exhibition of obedience which was quite startling in its efficiency.

The trick riding display brought back the strange days of "Cowboys and Indians," and the arena was filled with blood-curdling shrieks, with revolver shots and the crackling of fire as one by one the horses leapt through a circle of flame.

IN PARLIAMENT

Cruelty to Deer

Prior to the rising of the House of Lords for the Summer Recess, Lord Lovat called attention to the recommendations about deer in the report of the Committee on Cruelty to Animals (Cmd. 8266) and asked the Government whether they accepted these recommendations, and if so, what action they proposed. He moved for papers.

He said that desperadoes and organised gangs of butchers had turned their attention to the destruction of wild deer since they had been successfully prevented from continuing salmon poaching, and it would be to the credit of the Government, who had recently introduced measures which had had astonishingly rapid results against salmon poachers, if they could do the same against deer poachers. It had become a habit to kill deer with the minimum of exercise and the maximum of profit, as many as 25 to 30 head being killed in an afternoon. He recommended that the close season for red deer should be from January 1st to August 1st, that red deer should be promoted to the category of game animals, and that venison should not be sold through the market during the close season.

In the West of England the deer population has shrunk to 15 or 20 per cent. of the figure before the war, and many crippled deer were to be seen in Devon and Cornwall.

The Earl of Haddington said that great cruelty could be inflicted on deer when automatic weapons were used at night by inexperienced marksmen. There was a need for urgent action. He did not understand why the deer poacher in Scotland should be comparatively immune from penalty compared with the poacher in England.

Lord Saltoun said that he was horrified at the shooting of deer from boats and lorries and with tracer bullets. The suffering inflicted must be beyond description.

Lord Morrison, Parliamentary Secretary, Ministry of Works, said that if legislation was to be introduced it was not as simple as the Committee had contemplated. Agricultural repercussions might be considerable if a close season was introduced. The nature and extent of the repercussions would vary. No final opinion could be reached by the Government about the imposition of a statutory close season or the period during which such a season should extend until there had been consultations with the interests concerned. There would be no delay in completing the examination of the question now in progress. To introduce a Bill without full consultation first was likely to delay legislation.

Replying to the Earl of Haddington, Lord Morrison said the Government would welcome a private Bill, if any noble Lord cared to draft and introduce one.

The motion was, by leave, withdrawn.

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Questions

Livestock (Slaughtering)

Sir T. Moore (July 30th) asked the Prime Minister whether he will consider authorising a change of responsibility between the Minister of Agriculture and the Minister of Food in regard to animals, so as to ensure that the Minister of Agriculture will be responsible for animals destined for human consumption until they are actually slaughtered, and that the Minister of Food only assumes responsibility after such animals are, in fact food.

The Prime Minister: As I said in my reply to my hon. Friend the Member for Battersea, South (Mrs. Ganley), on July 2nd, discussions about the long-term arrangements for slaughtering home-produced livestock are now taking place between the Ministry of Food, the Ministry of Agriculture and Fisheries and the interests concerned, and any question of a change of responsibilities must await their outcome.

Sir T. Moore: Will the appropriate Ministers bear in mind that Ministry of Food inspectors, though probably admirable people in every way, have no real knowledge of the habits and ways of animals when they are alive? They know about them only when the animals are dead and become meat. Is it not in everyone's interest that the division of responsibility should be decided?

The Prime Minister: That is exactly why the consultations are taking place. The Ministry of Food largely deal with dead animals and the Ministry of Agriculture with live animals.

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Slaughterhouses

Lieut.-Colonel Sir Thomas Moore (July 30th) asked the Minister of Food how many slaughterhouses are in use in Britain to-day; how many are under construction; and how many are contemplated for erection.

Mr. F. Willey: There are 587 slaughterhouses in Great Britain being used by my Department. Two experimental slaughterhouses are being built at Guildford and Fareham, and, as my right hon. Friend announced on April 30th, 1951, an additional seven new slaughterhouses are to be built and work has already started on one of the sites. My right hon. Friend will make an early announcement about further plans.

Sir T. Moore: As the present congestion of animals awaiting slaughter involves suffering and loss, will not the Minister speed up the further erection of slaughterhouses or else re-open some of the 14,000 which existed before the war?

Mr. Willey: As the hon. and gallant Gentleman knows, this matter has been repeatedly reviewed. Unfortunately, the larger number of slaughterhouses are quite unsuitable, but I would ask the hon. and gallant Gentleman to await my right hon. Friend's statement.

Mr. Emrys Hughes: Will my hon. Friend resist any attempt to give slaughterhouses priority over other houses?

National Plan for Slaughterhouses

A statement on the above, made by the Minister of Food in the House of Commons on August 1st, is reproduced in our Notes and News columns.

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Poultry, Staffordshire (Blood Tests)

Mr. Snow (July 30th) asked the Minister of Agriculture the number of poultry blood-tested under his Department's arrangements for the latest convenient period in 1951 and for the same period in 1950, in the county of Staffordshire.

Mr. T. Williams: The number of birds tested for bacillary white diarrhoea in Staffordshire by my Department's officers between May 1st and June 30th, 1951, was 26,200, as compared with 21,560 tested in the same period last year.

Mr. Snow asked the Minister of Agriculture what check is employed by his poultry advisory officer in the county of Staffordshire to ascertain the true number of poultry yet to be blood-tested this year.

Mr. T. Williams: A list of the flocks to be tested for bacillary white diarrhoea is compiled at the beginning of the season by the county poultry advisory officer. The approximate number of birds in each flock is known from previous tests or, if there has been no previous test, from the report of the advisory officer's inspection. As the veterinary officers are supplied with these particulars they are able to compute, whenever it is necessary to do so, how many birds remain to be tested.

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Cruelty to Wild Animals (Otters)

Mr. Hastings (July 30th) asked the Under-Secretary of State for the Home Department, as representing the Lord President of the Council, whether he will take steps to arrange for the Nature Conservancy or the Bureau of Animal Population to investigate the habits and abundance of the otter, with a view to ascertaining whether, or to what extent and by what means, its numbers should be controlled, in view of the recommendations set forth in paragraph 316 of the Report of the Committee on Cruelty to Wild Animals, Command Paper No. 8266.

Mr. de Freitas: This recommendation, together with the other recommendations made by the Committee, is still under consideration.

A.H.T. SUFFOLK COLT FOAL AS SCULPTOR'S MODEL

A Suffolk colt foal which took first prize at the Royal and Peterborough shows was the model for a statue which stands on the South Bank Exhibition site near the Dome of Discovery. The sculptor, David McFall, wished to symbolise the robust vigour of youth in agriculture and applied to Professor W. C. Miller of the Animal Health Trust for help. The only subject he could find was the Animal Health Trust's own foal by Cattawade Commander out of Melody of Shray Hill. The sculptor's rendering is not exactly photographic, but it does convey the energy of the young Suffolk.—*East Anglian Daily Times.*

NOTES AND NEWS

Diary of Events

Aug. 22nd.—Meeting of the Society of Practising Veterinary Surgeons at Chester (Blossoms Hotel), 2.30 p.m.

Aug. 30th and 31st.—Clinical Conference, to be held at 83, Buccleuch Street, Glasgow, under the auspices of the West of Scotland Division, N.V.M.A., and University of Glasgow Veterinary School. (See Notice.)

Sept. 5th.—Meeting of the Editorial Executive 1.30 p.m.; Main Committee, 3 p.m. (*Members of the Executive are asked to note that there will be no meeting in August.*)

Sept. 23rd-29th.—Sixty-ninth Annual General Meeting and Congress of the National Veterinary Medical Association, at Eastbourne.

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Dishorning of Cattle

At a meeting of the Council of the Association held in Edinburgh on July 13th the following resolution sent forward by the Technical Development Committee was adopted:

> "That this Committee, having collected a considerable volume of evidence on various methods of dishorning cattle, expresses disapproval of the method of dishorning involving the use of a ligature whether or not an anaesthetic is given at the time of application, on both humane grounds and lack of efficiency."

In further discussions reported to Council the Technical Development Committee recommended that dishorning must be carried out under an efficient anaesthetic, the choice of which must remain within the discretion of the veterinary surgeon concerned.

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Congress Golf Competition

Those wishing to enter the competition for the "Simpson" Trophy and the ladies' competition for the "Dunkin" Trophy are requested to notify Mr. N. M. Barrie, M.R.C.V.S., 203, High Street, Lewes, Sussex, who is in charge of the arrangements.

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PERSONAL

Mr. Neil Mathieson's New Appointment

Members of the Association will learn with much regret that the Council of the N.V.M.A., at its meeting in Edinburgh, received the resignation from his post as Liaison Secretary of Mr. Neil Hughes Mathieson, M.R.C.V.S., and, with great reluctance, accepted it. We understand that Mr. Mathieson has accepted a position as Head of the Veterinary Department, Glaxo Laboratories Ltd., Greenford.

Deep satisfaction was felt when, in May of last year, it was found possible again to select from the numerous applicants for the post, a veterinary surgeon to succeed the first holder of the appointment, Mr. Geoffrey West, on his departure for the editorial staff of *Sport and Country*. Mr. Mathieson has followed up assiduously the many avenues of helpful service opened by his predecessor, notably in his development of closer contact between Headquarters and the Divisions of the Association, by attendance at meetings throughout the country, where his clear exposition of the objects and aims of the parent body was rendered the more acceptable by his ability as a speaker and respondent to questions.

The regret occasioned by the brevity of Mr. Mathieson's tenure of office is not confined to the officers and members to whom he has been so helpful, or to those members of the Press, commercial houses and the public who have benefited from his knowledge as a well-informed member of the profession: his office colleagues deeply appreciate his interpretation of his rôle as having also an internal application, and neither his breezy and genial daily round of their rooms nor his gifts as a raconteur readily will be forgotten. Everyone will wish him success and happiness in his new sphere.

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Professor Geo. F. Boddie

Our readers will be glad indeed to learn that the serious spinal operation undergone in January by Professor Boddie, of the University of Edinburgh Veterinary School, now seems likely to have proved entirely successful and that he appears also to have made a complete recovery from the circulatory trouble he experienced six weeks after the operation. While, to our mutual regret, he will not be able to attend the Congress next month, Professor Boddie is in what is hoped will be the last stages of convalescence after five months in the Edinburgh Royal Infirmary and six weeks at home, as he informs us "learning to walk again."

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Birth.—Corrigall.—On August 1st, 1951, at Burton House Maternity Home, Stafford, to Marion, wife of William Corrigall, M.R.C.V.S., a daughter—Helen Maureen.

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Forthcoming Marriage.—Carter—Powell.—This day, August 11th, 1951, at St. Andrew's Church, Sedbergh, Nigel Stansfield Carter, M.R.C.V.S., only son of Mr. and Mrs. C. V. Carter, of Kelmscott, Styal Road, Gatley, Cheshire, to Doreen, only daughter of Mr. and Mrs. Eric Powell, of Scrogram, Cautley Road, Sedbergh, Yorks.

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Medical Research Award.—Among the travelling awards for the academic year 1951-52 made by the Medical Research Council is that of a Travelling Scholarship in Medical Science (tenable in France under an exchange scheme with the Centre National da la Recherche Scientifique) to Mr. Stephen Vickers Boyden, B.Sc. (Lond.), M.R.C.V.S., Wellcome Fellow of the Animal Health Trust, Department of Animal Pathology, University of Cambridge.

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R.C.V.S. OBITUARY

Jolliffe, Conyers Herbert Hylton, F.R.C.V.S., Major late R.A.V.C., of 21, Adelaide Court, St. John's Wood, N.W. Graduated London, December 13th, 1898; Fellowship, May 15th, 1909. Died at the West London Hospital, following an operation, July 20th, 1951.

Major Hylton Jolliffe was the second son of the Hon. W. S. Hylton Jolliffe, D.L., J.P., Hants, M.P. for Petersfield 1874-80 (a younger brother of the second Lord Hylton), and was born on April 16 h, 1876. Joining the Army Veterinary Service, he served in the South African War, 1899-1902, and in the Great War, 1914-17, retiring with the rank of Major.

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UNIVERSITY OF EDINBURGH B.Sc. IN VETERINARY SCIENCE

Mr. Frank Robert Cochran, who qualified as a Member of the Royal College of Veterinary Surgeons in December, 1950, graduated B.Sc. in Veterinary Science at the University of Edinburgh on July 18th, 1951.

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National Plan for Slaughterhouses

Statement by the Minister of Food

Prior to the rising of the House of Commons for the Summer Recess, Mr. Maurice Webb, Minister of Food, made the following statement on the Government's plans for slaughterhouses:—

The House is aware that to meet the urgent need for more slaughterhouses, we have decided to build seven new ones in addition to the two experimental ones at Fareham and Guildford. We shall extend this emergency building programme as fast as we can, but, as will be realised, our building resources will not let us do all we want. In any case, these new slaughterhouses must be of the right sort and in the right places. I have, therefore, during the past few weeks, consulted the organisations concerned to see if it would be possible to prepare a national plan for slaughterhouses which could fit into any of the alternative long-term schemes for the distribution of meat and livestock which are now being considered by the Government.

There is the one extreme of a few factory type abattoirs of the kind used in North and South America, and there is the other extreme of a return to the pre-war system of slaughtering in thousands of places, some with good conditions and some with very bad. Having considered all the views put to us, the Government have decided that the requirements of hygiene, meat inspection, humane slaughtering and economy will best be met by a plan that